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NO. 42

LABORATORY BULLETIN

DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES, HELENA, MONTANA

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No. 42 - CURRENT NOTES AND SERVICES FROM THE CHEMISTRY LABORATORY BUREAU

1. Encephalitis - From the Malta area, 409 sera collected during the Heart Disease Screening program were tested by hemagglutination-inhibition for antibodies to Western Equine Encephalitis (WEE) and St. Louis Encephalitis (SLE) at the Rocky Mountain Laboratory in Hamilton. For WEE the incidence of antibodies was 34/409 (8.3 percent) and for SLE 15/409 (3.7 percent). This is a low rate of WEE antibodies for an endemic area. It is probably a reflection of practically no observable activity of the virus in man in Montana from the summer of 1965 when there were 18 clinical cases in man confirmed in the laboratory until the summer of 1971 when there were three laboratory-confirmed cases (see Bulletins Nos. 41 and 39). The finding of antibodies for SLE confirms other observations that this virus is present in Montana. However, the ecology of SLE virus is such that epidemics are not likely to occur here as they have in Texas and the St. Louis area. Las Vegas about September 1955 is the closest multiple-case outbreak of SLE I can recall. The classic outbreak which "discovered" SLE occurred in St. Louis in the summer of 1933. The Rocky Mountain Laboratory studied outbreaks of SLE in the Carribean area during the fifties.

2. Colorado tick fever - Already this season we have isolated four strains of virus. Two were from the same person in specimens taken six weeks apart. A "bad" year for ticks is in prospect and the only preventive measure for Colorado Tick Fever (CTF) is good tick hygiene. Keep them off by wearing protective clothing and remove them promptly if they do get on you. With Rocky Mountain spotted fever there is a "grace period" before the tick infects; not so with CTF. As soon as the tick inserts his probe, the virus may be injected because it resides in the salivary gland whereas spotted fever rickettsias are found in the tick gut. The specimen to send to the laboratory is 5 cc of whole, clotted blood. We inoculate the clot into L-cell tissue culture for recovery of the virus and do complement fixation tests for antibodies on the serum. Another specimen should be collected about 4 weeks after onset for antibody titer because they develop very slowly in CTF.

SERVICES PERFORMED IN THE CHEMISTRY LABORATORY BUREAU

Tests performed in the chemistry laboratory are program-oriented. They are concerned with the following projects: Air Quality Control, Water Quality Control, Alcohol and Drug Countermeasures in the Highway Safety Department, Consumer Protection (Food and Drug testing and Toxicology), and Industrial Hygiene and Occupational Health.

1. Air Quality Control: Lead, Particulates, Benzene solubles (mainly hydrocarbons), Fluorides, Sulfur dioxide, Oxides of Nitrogen, Arsenic, Cadmium, Zinc, Copper and Mercury.

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2. Water Quality Control: Total solids, Hardness, Iron, Arsenic, Zinc, Lead, Copper, Selenium, Odor, Turbidity, pH, Calcium, Magnesium, Sodium, Potassium, Carbonate, Bicarbonate, Sulfate, Chloride, Nitrate, Fluoride, Phosphate, Biological Oxygen Demand, Consumed Oxygen, and Phenol. There are charges for determination of suitability of water for household use, as follows: special tests for metals or basic chemical analysis - $5.00; complete chemical analysis - $10.00.

3. Alcohol and Drug Countermeasures - Highway Safety Program: Determination of ethyl alcohol content of samples of breath sent to the laboratory on SM-7 Sobermeters, maintaining 15 Alco-Analyzer gas chromatographs for determination of breath-alcohol content by law-enforcement officers and continuous external quality control on their results, training and certification of officers in the use of these instruments, analysis of blood and urine for ethyl alcohol, provision of expert testimony in court in connection with analyses performed, screening of urine samples for dangerous drugs and narcotics, quantitative analysis of body fluids for dangerous substances on the Varian 2800 Gas Chromatograph, and analysis of blood for carbon monoxide. (Most of the work in this program is carried out under responsibilities delegated to us in Section 32-2142.3, Revised Codes of Montana 1947 (The Implied Consent Law) and Board of Health and Environmental Sciences Regulation 60.002 (Quality Control of Alcohol Analyses)). A charge of $5.00 is made for determination of alcohol content of blood and urine.

4. Consumer Protection: Testing of food for Environmental Services Bureau - Food and Drug Control, Toxicology - heavy metals, barbiturates, identification of marijuana and pesticides. All of this testing has been done on an extremely limited basis and is an area identified for expansion in the next biennial budget. Determination of total blood cholesterol for the Heart Disease Prevention Project of the Preventive Health Services Bureau. Testing for product - safety.

5. Industrial Hygiene and Occupational Health: Although several persons in the Department have special competence in Industrial Hygiene, laboratory work in this field is limited because of insufficient funds. This is another target area for expansion during the next biennium. Some of the required laboratory procedures are the same as those used in environmental quality control programs. Of most concern to Industrial Hygiene and Occupational Health are tests for lead, cadmium, iron, mercury, arsenic, free silica, dust, elemental phosphorus, hydrocarbons (perchlorethylene, styrene, other benzene solubles), fluorides, and sulfuric acid mist. Of special interest to the Bureau of Mine Safety are tests for carbon dioxide, carbon monoxide, oxygen, and hydrocarbons - especially methane.